4.1 Production Management Overview

Production management deals with how farmers combine land, water, commercial inputs, labor, and their management skills into systems and practices that produce food and fiber. To sustain production over time, farmers must make a profit and preserve their resource and financial assets. Society wants food and fiber products that are low-cost, safe to consume, and aesthetically pleasing; and production systems that preserve or even enhance the environment. These often competing goals and pressures get reflected not only in the inputs made available for production, but also in how the inputs are combined and managed at the farm level. Increasingly, farmers are facing economic and societal pressures to change from traditional or conventional systems to improved or alternative ways of managing production.

Production management encompasses various challenges that the farmer must meet to produce food and fiber:

- **Crop residue management**—deciding how much crop residue to leave on the soil surface to protect soil and conserve moisture, based on topography, soil conditions and erosion, pests, and climate.
- **Cropping management**—deciding what crops to grow and in what sequence, based on rate of return, weather, soil, government programs, pests, and available machinery.
- **Pest management**—determining pest threats to crop growth and quality and what actions to take, mindful of food and worker safety and environmental impacts.
- **Nutrient management**—determining and applying the nutrients required to foster crop yields and farm profitability, while reducing nutrient loss to the environment.
- **Irrigation water management**—determining water needed for crop growth and applying that water efficiently, considering water availability and offsite water quantity/quality impacts.

These management challenges are each examined more fully in chapters 4.2-4.6, including the types and prevalence of conventional and alternative systems and practices, and the economic and other factors affecting their use. New technology (such as precision agriculture and genetically engineered seeds) and increasing interest in organic and sustainable agriculture are affecting some farmers' production management decisions.